

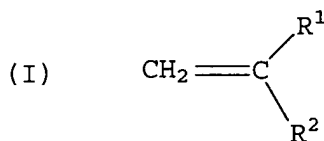
CLAIM AMENDMENTS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Claims 1-81 (canceled).

82. (currently amended) A continuous process for making a copolymer composition containing residues of at least one olefinic monomer comprising the steps of:

- (a) providing at least one pressurized stirred tank reactor (STR) having at least one inlet and at least one outlet;
- (b) feeding one or more monomer compositions to an STR by way of at least one of the inlets, wherein at least one monomer composition comprises one or more monomers having the following structure (I):

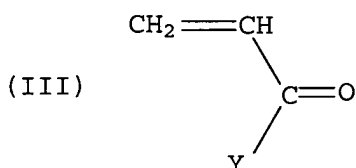


wherein R¹ is linear or branched C₁ to C₄ alkyl and R² is selected from the group consisting of methyl, linear, cyclic or branched C₁ to C₂₀ alkyl, alkenyl, aryl, alkaryl and aralkyl, any of which can optionally include one or more functional groups;

- (c) feeding one or more initiator compositions to the STR by way of one or more of the inlets;
 - (d) maintaining the ~~liquid level in the STR~~ hydrolytically full such that there is substantially no air or vapor space in the reactor;
 - (e) maintaining the monomer compositions in (b) and the initiator compositions in (c) in the STR for a residence time sufficient to effect conversion of the monomers to a copolymer composition; and
 - (f) discharging the copolymer composition by way of the outlet;
- wherein the monomers and initiators are introduced to the STR at essentially the same rate as the copolymer is withdrawn from the STR and any unreacted monomers of structure (I) are removed from the copolymer and used as part of at least one of the monomers compositions in (b).

83. (original) The method of claim 82, wherein at least one monomer composition in (b) comprises one or more monomers selected from the group consisting of styrene, substituted styrenes, methyl styrene, substituted methyl styrenes, vinyl ethers and vinyl pyridine.

84. (original) The method of claim 82, wherein at least one monomer composition in (b) comprises one or more monomers selected from the group consisting of acrylonitrile and acrylic monomers described by structure (III):



wherein Y is selected from the group consisting of $-\text{NR}^3_2$, $-\text{O}-\text{R}^5-\text{O}-\text{C}(=\text{O})-\text{NR}^3_2$, and $-\text{OR}^4$; R^3 is selected from the group consisting of H, linear or branched C_1 to C_{20} alkyl and linear or branched C_1 to C_{20} alkylol; R^4 is selected from the group consisting of H, poly(ethylene oxide), poly(propylene oxide), linear or branched C_1 to C_{20} alkyl, alkylol, aryl, alkaryl and aralkyl, linear or branched C_1 to C_{20} fluoroalkyl, fluoroaryl and fluoroaralkyl, a siloxane, a polysiloxane, an alkyl siloxane, an ethoxylated trimethylsilyl siloxane and a propoxylated trimethylsilyl siloxane; R^5 is a divalent linear or branched C_1 to C_{20} alkyl linking group; and R^3 and/or R^4 optionally include one or more functional groups.

85. (original) The method of claim 82, wherein the monomer of structure (I) is selected from the group consisting of isobutylene, diisobutylene, dipentene, isoprenol, and mixtures thereof.

86. (original) The method of claim 82, wherein the group R^2 of the monomer of structure (I) includes one or more functional groups selected from the group consisting of epoxy, carboxylic acid, hydroxy, amide, oxazoline, acetoacetate, isocyanate, carbamate, amine, amine salt, quaternized amine, thiol, methylol, methylol ether, and sulfonium salt.

87. (original) The method of claim 84, wherein Y includes at least one functional group of one or more selected from the group consisting of epoxy, carboxylic acid, hydroxy, amide,

oxazoline, acetoacetate, isocyanate, carbamate, amine, amine salt, quaternized amine, thiol, methylol, methylol ether, and sulfonium salt.

88. (original) The method of claim 82, wherein the resulting copolymer composition is reacted such that one or more functional groups are incorporated into the copolymer.

89. (original) The method of claim 88, wherein the functional groups incorporated into the copolymer are one or more selected from the group consisting of epoxy, carboxylic acid, hydroxy, amide, oxazoline, acetoacetate, isocyanate, carbamate, amine, amine salt, quaternized amine, thiol, methylol, methylol ether, and sulfonium salt.

90. (original) The method of claim 82, wherein the initiator composition comprises a thermal free radical initiator.

91. (original) The method of claim 90, wherein the thermal free radical initiator is selected from the group consisting of a peroxide compound, an azo compound, a persulfate compound, and mixtures thereof.

92. (original) The method of claim 91, wherein the peroxide compound is one or more selected from the group consisting of hydrogen peroxide, methyl ethyl ketone peroxides, benzoyl peroxides, di-t-butyl peroxides, di-t-amyl peroxides, dicumyl peroxides, diacyl peroxides, decanoyl peroxide, lauroyl peroxide, peroxydicarbonates, peroxyesters, dialkyl peroxides, hydroperoxides, and peroxyketals.

93. (original) The method of claim 91, wherein the azo compound is one or more selected from the group consisting of 4-4'-azobis(4-cyanovaleric acid), 1-1'-azobiscyclohexanecarbonitrile, 2-2'-azobisisobutyronitrile, 2-2'-azobis(2-methylpropionamidine) dihydrochloride, 2-2'-azobis(2-methylbutyronitrile), 2-2'-azobis(propionitrile), 2-2'-azobis(2,4-dimethylvaleronitrile), 2-2'-azobis(valeronitrile), 2,2'-azobis[2-methyl-N-(2-hydroxyethyl)propionamide], 4,4'-azobis(4-cyanopentanoic acid), 2,2'-azobis(N,N'-dimethyleneisobutyramidine), 2,2'-azobis(2-amidinopropane) dihydrochloride, 2,2'-azobis(N,N'-dimethyleneisobutyramidine) dihydrochloride, and 2-(carbamoylazo)-isobutyronitrile.

94. (original) The method of claim 82, wherein any of the monomer compositions contain one or more of the monomers selected from the group consisting of hydroxyethyl acrylate, hydroxypropyl acrylate, acrylic acid, methyl acrylate, ethyl acrylate, butyl acrylate, isobutyl acrylate, isobornyl acrylate, dimethylaminoethyl acrylate, acrylamide, chlorotrifluoroethylene, glycidyl acrylate, 2-ethylhexyl acrylate and n-butoxy methyl acrylamide.

95. (original) The method of claim 82, wherein after discharging the copolymer composition in (f), the copolymer composition is fed to a flash tank.

96. (original) The method of claim 95, wherein unreacted monomer of structure (I) is substantially recovered from the resulting copolymer composition by applying a vacuum to the flash tank.

97. (original) The method of claim 95, wherein the copolymer composition is discharged from the flash tank.

98. (original) The method of claim 82, wherein after discharging the copolymer composition in (f), the copolymer composition is mixed with a solvent.

99. (original) The method of claim 96, wherein the recovered unreacted monomer of structure (I) comprises a portion of the monomer composition in (b).

100. (original) The method of claim 82, wherein the residence time in the STR in (e) is from 5 minutes to six hours.

101. (original) The method of claim 82, wherein the residence time in the STR in (e) is a period of time sufficient to incorporate at least 75 mole % of the monomers of structure (I) into the copolymer composition.

102. (original) The method of claim 82, wherein mixing is applied by the STR in (e).

103. (original) The method of claim 82, wherein no mixing is applied in (e).

104. (original) The method of claim 82, wherein a back pressure control valve is positioned on the outlet.

105. (original) The method of claim 82, wherein the pressure in the STR is maintained at a pressure above the vapor pressure of any monomer in any of the monomer compositions in (b).

106. (original) The method of claim 82, wherein the pressure in the STR is from 300 to 1,000 psi.

107. (original) The method of claim 82, wherein the monomer compositions in (b) and the initiator compositions in (c) are fed to the STR by way of high pressure pumps.

108. (original) The method of claim 82, wherein the monomer compositions in (b) and the initiator compositions in (c) are mixed prior to being fed to the STR.

109. (original) The method of claim 82, wherein the inlets empty into a bottom portion of the STR.

110. (original) The method of claim 108, wherein the monomer compositions in (b) and the initiator compositions in (c) are mixed using a static mixer.

111. (original) The method of claim 82, wherein the temperature in the reactor is maintained at a temperature of from 50°C to 300°C.

112. (original) The method of claim 82, wherein after discharging the copolymer composition in (f), the copolymer composition is fed to a second STR.

113. (original) The method of claim 112, wherein the copolymer composition is fed from the second STR to a third STR and discharged therefrom.

114. (original) The method of claim 112, wherein the copolymer composition is discharged from the second STR to a flash tank.

115. (original) The method of claim 113, wherein the copolymer composition is discharged from the third STR to a flash tank.

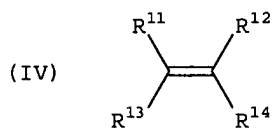
116. (original) The method of claim 82, wherein after discharging the copolymer composition in (f), the copolymer composition is fed to a wipe film evaporator.

117. (original) The method of claim 116, wherein the copolymer composition is discharged from the wipe film evaporator to a flaker to provide the copolymer composition in dry form.

118. (original) The method of claim 82, wherein the monomer compositions in (b) comprise greater than 50 mole %, based on the total number of moles of monomer in the monomer compositions of the monomers of structure (I).

119. (original) The method of claim 118, wherein the amount of the monomers in structure (I) do not exceed 55 mole %.

120. (original) The method of claim 82, wherein one or more of the monomer compositions in (b) include one or more residues derived from other ethylenically unsaturated monomers of general structure (IV):



wherein R¹¹, R¹² and R¹⁴ are independently selected from the group consisting of H, CF₃, straight or branched alkyl of 1 to 20 carbon atoms, aryl, unsaturated straight or branched alkenyl or alkynyl of 2 to 10 carbon atoms, unsaturated straight or branched alkenyl of 2 to 6 carbon atoms substituted with a halogen, C₃-C₈ cycloalkyl, heterocyclyl and phenyl; R¹³ is selected from the group consisting of H, C₁-C₆ alkyl, COOR¹⁵, wherein R¹⁵ is selected from the group

Application No. 10/723,488
Amendment Dated January 24, 2006
In Reply to USPTO Office Action Dated December 23, 2005
Attorney Docket No.: 1897A1

consisting of H, an alkali metal, a C₁ to C₆ alkyl group, glycidyl and aryl, which can optionally include one or more functional groups.

121. (original) The method of claim 120, wherein the other ethylenically unsaturated monomers are one or more selected from the group consisting of methacrylic monomers and allylic monomers.

Claims 122-124 (canceled).